Water for Profit

WHAT'S THAT (DIESEL) PUMP COSTING YOU?

WATERFORPROFIT

Pumping efficiency tests completed as part of system auditing within the Rural Water Use Efficiency Initiative found that many systems are operating inefficiently and costing growers more than is required.

Introduction

There are a number of reasons for inefficient operating:

- worn pumps
- poor pump selection
- improper motor size
- changes in application systems (big gun – drip tape)

This Water for Profit sheet provides information enabling you to determine pump costs. By repeatedly checking the system over a period of time you will be able to develop maintenance programs and determine replacement recovery costs.

When the irrigation system was originally designed, a pump would have been chosen to provide sufficient head pressure, including friction losses, so that the sprinkler located at the highest point in the irrigation block operated efficiently.

Invariably you would not have been provided with a projected operational cost for the life of the pump. Figures show that initial purchase price is only 5% of the total cost over a ten year period (electrical driven units).

Over time farming practices may have changed, new irrigation systems may have been purchased, water supply may have varied and/or the pumping unit has become worn. All these factors can contribute to an increase in costs that will directly affect your profit margin.

How to determine pumping costs

The elements required to calculate costs are:

- Diesel consumption per hour
- Discharge rate per hour
- Pump operating pressure
- Diesel cost per litre after rebate.

What does this all cost?

- Current benchmark recommendations are:
- New: 48 cents / psi / ML
- Old: 59 cents / psi / ML
- Based on: pump efficiency of 70% and diesel cost after rebate of 46 centre per litre.
- Flow rate per hour: l/sec x 3600. Example: 30 x 3600 = 108 000.
- Cost of diesel consumption per hour: consumption/hr x $/litre. Example: 20 x 0.80 = 16.
- $/ML: 1000000 ÷ flow rate/hr x $diesel/hr. Example: 1 000 000 ÷ 108 000 x 16 = $ 148.
- Pump pressure measured in psi (A). Example: 120 psi.
- To calculate c/psi/ML = ($/ML x 100) ÷ A. Example: (148 x 100) ÷ 120 = 123 cents per psi.

As well as calculating actual cost in relationship to diesel cost/ litre we can also use a constant (46 cents/litre) to gauge how cost effective the pumping unit is operating in relation to others. This pumping unit measured in direct comparison to the benchmark figure is operating inefficiently at 71 cents/psi/ML.

Diesel consumption

Flow meter or tank measurement

Start	Finish	Total

Time between readings: _____ seconds

Consumption (litres diesel / hour) = TOTAL litres _____ ÷ secs _____ x 3600 = _____

Diesel cost per litre

Before rebate	Rebate amount	Rebate cost

Water meter

Type of meter _____

Start	Finish	Total

Time between readings: _____ seconds

Discharge rate (litres water / hr) = TOTAL litres _____ ÷ seconds _____ x 3600 = _____

Pumping unit

PRESSURE AT PUMP measured in PSI (A):

Calculating cost

From the data collected you are now able to calculate pumping costs.

To calculate $/ML (1 000 000 ÷ litres water / hr) x (rebated diesel cost /l x fuel consumed per hour)

		Litres water / hour	Rebated diesel cents / L	Fuel consumed L/hr	$/ML
General Rate	1 000 000	÷	x		
Benchmark Rate	1 000 000	÷	x 0.45		

To calculate c/psi/ML ($/ML x 100) ÷ Pressure at the Pump (A)

$/ML		A	c/psi/ML
General Rate	x 100	÷	
Benchmark Rate	x 100	÷	

For more details contact Growcom on 07 3620 3844.

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